the surfaces of these shells for the punctations indicative of true perforations, or that (as he himself suggests) his punctated shell, though resembling *Sp. cuspidata* in external characters, really belongs to a different genus. I trust that I shall be able, ere long, to clear up this part of the question, Mr. Davidson having written to request that Mr. Meek will send me chips of his punctated *Spirifera*, and that Prof. Winchell will send me chips of a shell belonging to his genus *Syringothyris*. When I shall have examined these, I shall report to you the results without delay.

I remain, Gentlemen,
Your obedient Servant,
WILLIAM B. CARPENTER.

P.S.—Mr. Davidson permits me to add the following extract from a note which he has written to me after perusing the above:—"I have always placed the most implicit reliance on your admirable observations on the shell-structure of the Brachiopoda, and therefore, as far as I am personally concerned, would not have required the additional confirmation given by your recent researches; but I am not sorry that you should have again investigated the matter, as it can but strengthen the value of your discoveries,—and the more so, as I have always found this shell-structure to be combined with internal modifications, so that *a perforated species could not be generically the same as an imperforate one.* This has now been observed in so many instances, that the supposed exceptions brought forward by Messrs. Meek and King are, no doubt, the result of incorrect observation. To make this clear to the public was therefore a matter of some importance, and I am very glad you have done so."

University of London, Burlington House.
Dec. 10, 1866.

VII.—*On the Correlation of the Lower Lias at Barrow-on-Soar, in Leicestershire, with the same Strata in Warwickshire, Worcestershire, and Gloucestershire; and on the occurrence of the remains of Insects at Barrow and in Yorkshire.* By the Rev. P. B. BRODIE, M.A., F.G.S.*

As my friend Professor Jukes has already described the Lower Lias at Barrow and the neighbourhood in Potter's Charnwood Forest, it will merely be necessary thus briefly to refer to his account; but I shall draw attention to one section not given by

* Communicated by the Author, having been read at the Meeting of the British Association in Nottingham, August 1866.

him, taken from an upper quarry of Mr. Lee's, in order to identify the beds, where we have, in descending order,

		ft.	in.
	1. Drift-sand and red clay, with rolled boulders of Lias.	8	0
	2. Blue shale	3	0
Lima-beds.	3. Hard blue limestone (rummels), with young *Lima gigantea*, *L. duplicata*, and numerous characteristic Ammonites of the *Lima* series, which is here much reduced in bulk	0	9
Insect-beds.	4. Thick blue shale	4	0
	5. Blue limestone	0	6
	6. Black shale	1	2
	7. Limestone	0	6
	8. Black shale	1	0
	9. Blue, nodular, and crystalline limestone (top hurls)—a very peculiar band, resembling a stratum adjacent to the "firestone" of Warwickshire, as at Wilmcote and Grafton in that county	0	6
	10. Shale. Bottom of quarry.		
	Total	19	5

As Mr. Jukes correctly observes, the strata vary considerably, even in adjacent quarries; certain beds thin out, and others come in: thus, in Mr. Ellis's large pit on the other side of Barrow, there are at least 30 feet of shale above the "rummels" (No. 3 in the section), and there are more courses of limestone, especially those which appear to represent the "Insect-limestones." The "rummels" (No. 3) is evidently the equivalent of the "*Lima*-beds" elsewhere, though only 9 inches thick; and these are immediately succeeded by the "Insect-limestones" and included shales, which are not generally so largely developed here as they are in Warwickshire and Worcestershire as to number and thickness, although on the whole the series which may be considered to belong to this zone is quite as thick as it is in Warwickshire. Deducting 8 feet for the superincumbent drift, the total thickness of the Lias exposed in the above section is only 11 feet 5 inches. In another of Mr. Lee's quarries a section given by Mr. Jukes makes the Lias 28 feet 6 inches, and one at Horton 20 feet, the *Lima*-beds being 6 feet at the former. It is impossible to say to what extent the *Ostrea*- and other beds prevail here, or whether the Rhætic series is present beneath, as indicated by a boring below the "firestones" at Wilmcote in Warwickshire. But possibly there may be a considerable thinning-out of this lower portion of the Lias and the underlying Rhætics in this direction, although they have been lately detected by Mr. Burton near Gainsborough, in Lincolnshire, and described by him in a paper read at the late meeting of the

British Association. From an account I have received of some Lias sections in Nottinghamshire, it may be inferred that the same series also occurs there in its proper position. Most of the pits at Barrow do not exceed 30 feet in depth; but some have been opened to a depth of 42 feet, the lowest stratum being a bed of blue marly clay.

The limestones are used in Leicestershire for the same economical purposes as the Warwickshire paving-stones, and are equally well adapted for this object; but they were not employed on the spot, when I visited Barrow some years ago, for making hydraulic lime, as they are in the extensive quarries belonging to my friends Messrs. Greaves & Kershaw at Wilmcote, near Stratford-on-Avon, though I have little doubt they might be profitably employed for this purpose.

In places there are several small faults; and in one pit the lower strata are thrown up so as to form a complete saddle, of limited extent, at right angles to Mount Sorrel, not far off, showing, on a small scale, what the effect of such a dislocation would be on a large one. At Wilmcote, in Warwickshire, there are also indications of numerous faults in all directions round the district—more than has generally been supposed. Thus the "firestone," which is the lowest and hardest stratum worked, crops out at various points and dips at a considerable angle, on the higher ground, and the several bands of Insect-limestone and shale lie in a basin formed by the outcrop of the lower bed. The "*Lima*-beds," containing the usual characteristic fossils, occur in places in their normal position, more or less denuded. The Insect-beds are more numerous, at least eight courses divided by thick shale, in Warwickshire than in Leicestershire, Worcestershire, Gloucestershire, or Somersetshire; and the other Liassic and Rhætic beds being present below them gives a completeness to the Warwickshire sections not met with elsewhere. Except in No. 3 of the above section, shells are scarce; below this I observed only a few of *Ammonites planorbis* and *Aptychus*, and a species of *Inoceramus* common in the shale at Brockeridge Common, near Tewkesbury, in Gloucestershire, and there associated with numerous and beautiful specimens of the same Ammonite. The fine Saurians and fish for which this district (Barrow) has long been famous occur more or less in all the shales and limestones, though some courses are richer than others, more so apparently with respect to the latter than the same zone in Warwickshire. But neither at Barrow nor in other places are the Saurians or fish confined to this division of the Lias, but, as at Lyme (as Mr. Day has shown in an able and interesting paper read at the meeting of the British Association in Birmingham in 1865), have a wide vertical range. The genus

Dapedius seems to be the most abundant; and among several fine fish in Mr. Lee's collection, since sold, I noticed one nearly 2 feet long, belonging to a different genus, and in a remarkably fine state of preservation. The following species of fish have been recorded from Barrow and elsewhere :—

Pholidophorus Stricklandi.
—— Hastingsæ.
—— sp.?
Dapedius orbis.
Tetragonolepis monilifer.
—— striolatus.
Lepidotus serrulatus.

Pholidophorus Stricklandi occurs also in Warwickshire, and *Dapedius orbis* and *Tetragonolepis monilifer* in Warwickshire, Worcestershire, and Gloucestershire. The *Plesiosaurus*, as usual, is much less frequent than the *Ichthyosaurus*; but fine and entire specimens of both have been obtained. Among the Crustacea, *Eryon Barrovensis* and *Glyphæa liassica* are common to all these districts; but the former is much larger at Bidford and Wilmcote, in Warwickshire. This Crustacean has a wide horizontal range; for I have noticed it in this lower division of the Lias, associated with insects, in Leicestershire, Warwickshire, Worcestershire, and Somersetshire; and it has also been found in Dorsetshire. My friend Mrs. Hutton (late Miss Holland) has a fine specimen from the Upper Lias of Dumbleton; but I have not observed it in the intervening beds.

At the time of my visit to Barrow, I could not find or hear of any remains of insects, although I suspected that a careful search would detect them; and not long since, my lamented friend Mr. Wyatt Edgell obtained a portion of a gigantic wing of one of the Libellulidæ (now in my collection) and a large elytron of *Buprestis* (?). No doubt other genera will be discovered there and in Nottinghamshire, as they have already been by my friend the Rev. W. Norwood in the "Insect-limestones" in Yorkshire, which therefore have a very extensive horizontal range and are characterized by the same remains of insects throughout; indeed these remains really distinguish them far better than the Saurians, which, as stated, have a much wider vertical range. I suspect, too, that the Ammonite-zones of some geologists will ultimately have to be either modified or abandoned; for some of the species have a much less limited area of existence than has been hitherto supposed.

Note.—Mr. Burton informs me that he has not yet observed any trace of the Insect-beds above the Rhætics near Gainsborough.